

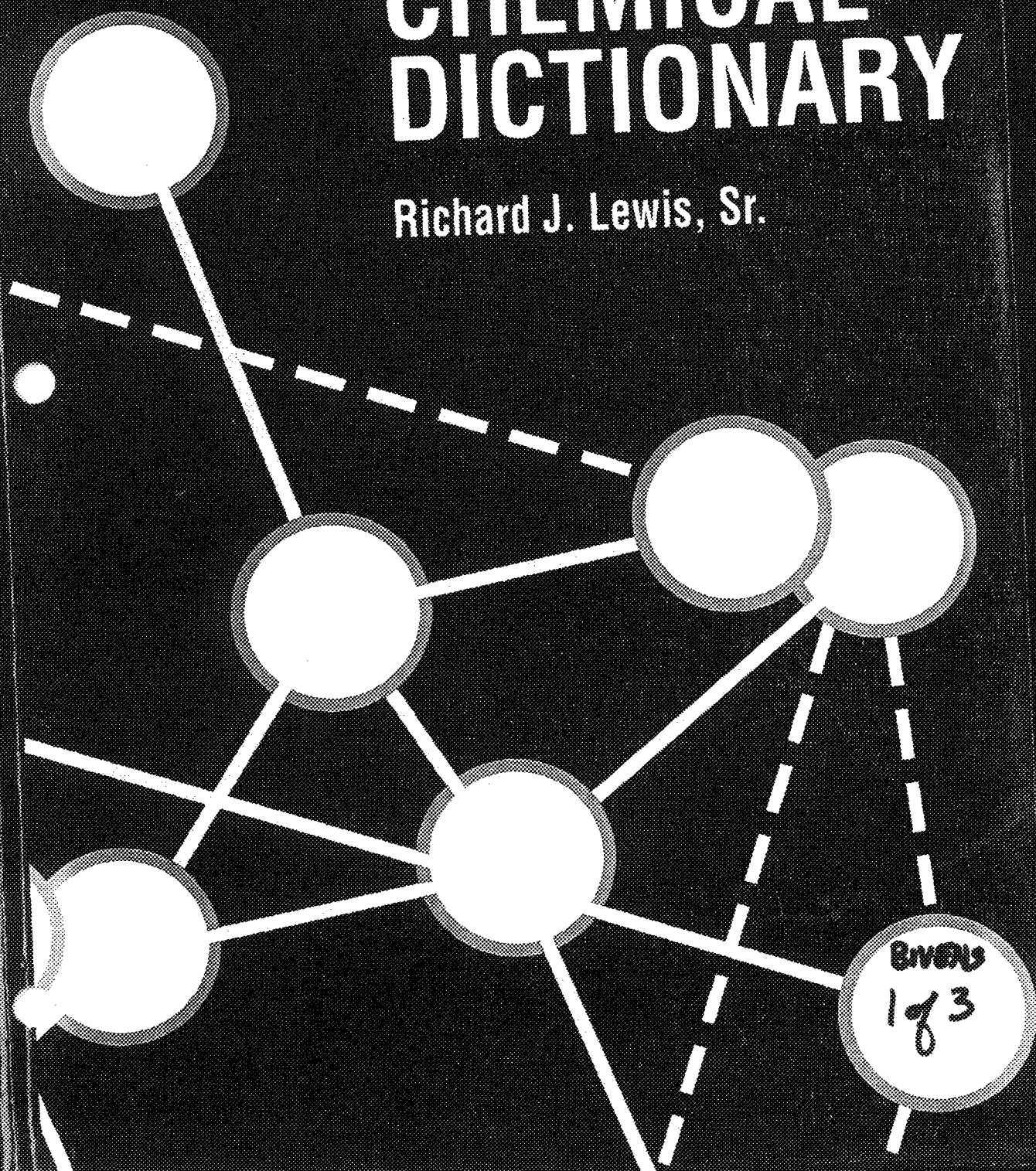
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Exhibit C

Hawley's

Twelfth Edition

CONDENSED CHEMICAL DICTIONARY

Richard J. Lewis, Sr.



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Library of Congress Catalog Card Number 92-18951
ISBN 0-442-01131-8

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Printed in the United States of America

Van Nostrand Reinhold
115 Fifth Avenue
New York, NY 10003

International Thomson Publishing GmbH
Konigswinterer Str. 518
5300 Bonn 3
Germany

International Thomson Publishing
Berkshire House, 168-173
High Holborn, London WC1V 7AA
England

International Thomson Publishing Asia
38 Kim Tian Rd., #0105
Kim Tian Plaza
Singapore 0316

Thomas Nelson Australia
102 Dodds Street
South Melbourne 3205
Victoria, Australia

International Thomson Publishing Japan
Kyowa Building, 3F
2-2-1 Hirakawacho
Chiyoda-Ku, Tokyo 102
Japan

Nelson Canada
1120 Birchmount Road
Scarborough, Ontario
M1K 5G4, Canada

16 15 14 13 12 11 10 9 8 7 6 5 4

Library of Congress Cataloging-in-Publication Data

Condensed chemical dictionary.

Hawley's condensed chemical dictionary.—12th ed./revised by
Richard J. Lewis, Sr.

p. cm.

ISBN 0-442-01131-8

I. Chemistry—Dictionaries. I. Hawley, Gessner Goodrich, 1905-1983

II. Lewis, Richard J., Sr. III. Title.

QD5.C5 1992

540'.3—dc20

92-18951

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acteristics of the reactor nearly constant during use.

burnt lime. See calcium oxide.

burnt sienna. See iron oxide red.

burnt umber. See umber.

"Buromin" [Calgon]. TM for sodium hexametaphosphate in glass plate form for boiler water conditioning.

"Burosil" [Calgon]. TM for a granular, alkaline, phosphate-silicate compound used in boiler-water conditioning to precipitate calcium and magnesium as loose sludge.

burr mill. See attrition mill.

bushy stunt virus. A viral protein present in tomato-plant infections.

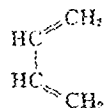
Properties: Mw 7,600,000, pH 4.1.

See virus.

"Butacite" [Du Pont]. TM for polyvinyl butyral resin, available as soft pliable sheeting in 750-ft rolls 10-84 inches wide.

See polyvinyl acetal resins.

1,3-butadiene. (vinylethylene; erythrene; bivinyl; divinyl). CAS: 106-99-0. $\text{H}_2\text{C}=\text{CHCH}=\text{CH}_2$. 37th highest-volume chemical produced in U.S. (1991)



Properties: Colorless gas with mild aromatic odor, easily liquefied, bp -4.41°C , d 0.6211 (liquid at 20°C), fp -108.9°C , flash p -105°F (-76°C), specific volume 6.9 cu ft/lb (700F), autoign temperature 780F (414C), vap press 17.65 psia (0°C). Soluble in alcohol and ether, insoluble in water. The material polymerizes readily, particularly if oxygen is present, and the commercial material contains an inhibitor to prevent spontaneous polymerization during shipment or storage.

Derivation: (1) Catalytic dehydrogenation of butenes or butane; (2) oxidative dehydrogenation of butenes.

Method of purification: Extractive distillation in the presence of furfural, absorption in aqueous cuprous ammonium acetate, or use of acetonitrile.

Grade: Technical (98.0%), CP (99.0%), instrument (99.4%), research (99.8%).

Hazard: Irritant in high concentration. TLV: 10

ppm in air. A suspected human carcinogen. Highly flammable gas or liquid, explosive limits in air 2-11%. May form explosive peroxides on exposure to air. Must be kept inhibited during storage and shipment. Inhibitors often used are di-n-butylamine or phenyl- β -naphthylamine. Storage is usually under pressure or in insulated tanks $<35^\circ\text{F}$ (1.67°C).

Use: Synthetic elastomers (styrene-butadiene, polybutadiene, neoprene, nitriles), ABS resins, chemical intermediate.

butadiene-acrylonitrile copolymer.

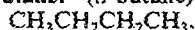
See nitrile rubber.

butadiyne. See diacetylene.

butaldehyde. See butyraldehyde.

butanal. See butyraldehyde.

butane. (n-butane). CAS: 106-97-8.



Properties: Colorless gas, natural-gas odor, extremely stable, has no corrosive action on metals, does not react with moisture, very soluble in water, soluble in alcohol and chloroform, bp -0.5°C , fp -138.3°C , condensing pressure approximately 30 lb at 32.5°C , d (liquid at 0°C) 0.599, d (vapor at 0°C ; air = 1) 2.07, critical temperature 153.2°C , critical pressure (absolute) 525 psi, heating value (25C) 3266 Btu/cu ft, specific volume (21.1C), 6.4 cu ft/lb, flash p -76°F (-60°C), autoign temperature 761F (405C). An asphyxiant gas.

Derivation: A by-product in petroleum refining or gasoline manufacture.

Grade: Research 99.99 mole %, pure 99 mole %, technical 95 mole %, also available in various mixtures with isobutane, propane, pentanes, etc.

Hazard: Highly flammable, dangerous fire and explosion risk. Explosive limits in air 1.9 to 8.5%. TLV: 800 ppm in air. Narcotic in high concentration.

Use: Organic synthesis, raw material for synthetic rubber and high-octane liquid fuels, fuel for household and for many industrial purposes, manufacture of ethylene, solvent, refrigerant, standby and enricher gas, propellant in aerosols, pure grades used in calibrating instruments, food additive.

Note: Butane in liquid form may be stored both above and below ground. Besides storage in liquefied form under its vapor pressure at normal atmospheric temperatures, refrigerated liquid storage at atmospheric pressure may be used. Such systems are closed and insulated, and the liquid petroleum gas vapor is circulated through pumps and compressors to serve as the refriger-

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